Abstract

Every community must prepare for and respond to hazardous events, whether a natural disaster like a tornado or a disease outbreak, or a human-made event such as a harmful chemical spill. Communities prepare, respond, and recover uniquely in the face of these hazardous events. Factors which contribute to social vulnerability, including poverty, lack of access to transportation, and crowded housing, may weaken a community’s ability to prevent human suffering and financial loss in the event of disaster.

Here we illustrate the Social Vulnerability Index (SVI) and associated tools developed by CDC/ATSDR’s Geospatial Research, Analysis and Services Program (GRASP) to help state and local partners identify socially vulnerable communities.

SVI Uses

The SVI can be used in many ways. Some examples:

- Estimate the amount of needed supplies like food, water, medicine, and bedding.
- Help decide how many emergency personnel are required.
- Identify areas in need of emergency shelters.
- Plan the best way to evacuate people, accounting for those who have special needs, such as people without vehicles, the elderly, or people who do not understand English well.
- Identify communities that will need continued support to recover following an emergency or natural disaster.
- Decide how to allocate emergency preparedness funding.

SVI ArcGIS Tools

The SVI toolkit is an evolving set of geoprocessing tools that enable you to work with SVI data as well as other spatial data. Here we highlight four of the tools:

1. **ACS toolbox**: To more easily work with American Community Survey estimates in ArcGIS, we developed the ACS toolbox. This toolbox uses Census specifications detailed in A Compass for Understanding and Using American Community Survey Data.

2. **Bivariate Choropleth Mapping**: Enables display of two variables on one map.

3. **Population Estimator**: Estimates the population in a user-defined area surrounding a specified feature or features of interest.

4. **Poisson Probability Calculator**: Probability mapping is one method for dealing with the small numbers problem, which often occurs when working with health data. The Poisson test, a commonly used statistical technique, models the probability of rare binary events in large populations. Results from the Poisson test can be mapped to determine the distribution of significantly high areas.

What is the SVI?

The Social Vulnerability Index uses U.S. Census data to determine the relative social vulnerability of every census tract. The SVI ranks each tract on 14 social factors and groups them into four related themes. Each tract receives a separate ranking for each of the four themes, as well as an overall ranking.

The SVI can help emergency response planners and public health officials identify and map the communities that will most likely need support before, during, and after a hazardous event.

The map shows overall vulnerability, at census tract level, for the lower 48 states. The table above shows a small portion of the 2010 SVI database.

(1) ACS toolbox
(2) Bivariate choropleth mapping
(3) Population Estimator
(4) Poisson Probability Calculator

SVI Website - http://svi.cdc.gov

E-mail: svi_coordinator@cdc.gov | Web: svi.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Agency for Toxic Substances and Disease Registry.